

## 9. Specialising in I2S

Even after exploring only the first domain of I2S, it is clear that there are many specialist concepts, methods and skills that will assist integrative applied research teams to enhance their effectiveness—and that there are too many for experts in existing disciplines to simply add to their repertoires. I propose that there are three broad categories of I2S specialisation.

1. I2S for team leaders. Leaders must know enough about I2S to be responsible for I2S processes, like deciding on the integrative applied research aims and who will undertake the knowledge synthesis.
2. I2S disciplinary specialists. They must have detailed knowledge of concepts, methods and case examples, as well as guides to relevant knowledge from outside I2S, to assist integrative applied research teams in choosing how they will proceed from the full range of available options. In addition, I2S disciplinary specialists are responsible for strengthening their own discipline, including ensuring appropriate application of existing methodologies, as well as developing new ones.
3. I2S appreciation for other integrative applied research team members. They need to have a general understanding of I2S so that they can effectively work with their team leader, the I2S disciplinary specialist(s) and each other.

### I2S for Team Leaders

Team leaders have responsibility for the project as a whole. Their knowledge about I2S enables them to guide a process of working systematically through the five questions and ensuring the wherewithal to do so; in other words, that each team includes one or more I2S disciplinary specialists who have the necessary conceptual and method skills for the tasks such as scoping, framing and synthesis of disciplinary and stakeholder knowledge.<sup>1</sup> Leaders also have responsibility for how decisions about knowledge synthesis are made—for example, whether all team members are involved or whether the team leader or a small group is charged with deciding which disciplinary and stakeholder knowledge to bring together and how. The leaders' I2S expertise must be comprehensive enough to direct the tasks described in Box 9.1.

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<sup>1</sup> Of course, the leader may themselves be an I2S specialist; however, for the purposes of a straightforward discussion, I treat team leaders and I2S specialists separately.

### **Box 9.1 Specific I2S Responsibilities for Integrative Applied Research Team Leaders**

Team leaders must have adequate knowledge about I2S to ensure that

- objectives and beneficiaries are specifically considered, so that teams target their efforts most effectively
- their teams are open to options when considering all aspects of knowledge synthesis including various systems views, ways of scoping and methods for knowledge synthesis
- differences are appropriately harnessed or managed
- their teams understand that formulaic processes are not realistic; instead research is messy, iteration is essential and the investigative process will evolve as the project progresses (this must be counterbalanced by making pragmatic, defensible decisions and not getting bogged down in process)<sup>a</sup>
- sources of authorisation and how they affect what is investigated are understood
- organisational barriers and facilitators, and how they can be, respectively, overcome and exploited are understood
- their teams are committed to drawing on, and contributing to the further development of, the best I2S concepts, methods and case examples, as well as guides to relevant knowledge from outside I2S.

a. This is true not only for the considerations in question two, but also for the five questions as a whole. For example, in this domain, it is very difficult to determine all the relevant angles, and to get them 'right', up front. Instead, it is common for important disciplines or stakeholders to be overlooked, for experts with mismatched skill sets to be chosen, for less important areas to be overemphasised, and so on. A critical role of the team leader is, therefore, to help the team implement a research process that is iterative and evolves as the research progresses.

## **I2S Disciplinary Specialists**

I2S disciplinary specialists have the detailed knowledge that makes it possible for integrative applied research teams to function effectively. Their knowledge about I2S provides them with an overview of the full scope of the discipline, mastery of relevant concepts and methods, and the ability to apply them, which they have learnt through case studies and hands-on experience. They are also adept at using guides to relevant knowledge from outside I2S. It is unlikely that individual specialists will be equally proficient in all of the relevant concepts, methods, guides and applications, but they will have a basic working knowledge of them all and be able to bring in colleagues if their team needs skills that they do not have. I2S disciplinary specialists, therefore, have an understanding of all of the tasks described in Box 9.2 and outstanding ability in some of them. One

of their chief roles is to make the team leader and other team members aware of available options and their strengths and weaknesses, assisting the choice of the most apposite for the particular problem, as well as team skills and inclinations.<sup>2</sup>

### Box 9.2 Skills for I2S Disciplinary Specialists

I2S disciplinary specialists must have a basic working knowledge of all of the following specific skills and particular competence in some

- systems thinking to conceptualise and deal with problems as systems
- scoping to determine the full range of systems views that could be applied to the problem, as well as the relevant disciplines and stakeholders, including what they could contribute and how
- boundary setting to determine what is included and excluded, as well as which of the included disciplinary and stakeholder knowledge is central and which is more peripheral
- framing to communicate the approach to the problem accurately and effectively
- dealing with values
- methods for knowledge synthesis, including dialogue methods, modelling and other targeted techniques (using products and vision), and common metric-based methods
- understanding overall context to ensure that the most important factors are considered.

Another key responsibility is to continue the development of the I2S discipline by

- being on the lookout for opportunities to improve, or develop new, concepts, methods and guides, and to publish any advances
- writing up innovative aspects of projects as new case examples
- ensuring that the knowledge synthesis is documented in a way that makes it easy to evaluate and draw lessons from—by teams themselves and by peers
- helping teams reflect on outcomes and ways to improve the application of the I2S discipline in future projects
- being involved in conferences and the reviewing process for grants and publications.

Such activities will continue to hone their expertise, as well as to enhance the quality and contributions of the discipline.

<sup>2</sup> Although skills and inclinations should not be the main driving forces (as I have discussed under scoping and boundary setting in Chapter 5), they are relevant factors.

## I2S Appreciation for Other Integrative Applied Research Team Members

The extent to which other team members require an appreciation of the I2S discipline depends on the specific type of integrative applied research being undertaken. If the intention is to have strong team involvement in all the knowledge synthesis activities then the team members need to have a good overview of I2S to allow them to trust and fully participate in the processes established by their team leader and the I2S disciplinary specialist(s). On the other hand, if the team leader and the I2S disciplinary specialist(s) undertake all or most of the knowledge synthesis activities, with the other team members predominantly involved in making their expertise available but not engaging in scoping, synthesis or other processes, the other team members do not need as much familiarity with the I2S discipline.

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In wrapping up this section, it is useful to recall the analogies with statistics described in Chapters 1 and 2. The different I2S specialisations in an integrative applied research team can be likened to the range of statistics expertise in a team-based quantitative research project. The team leader does not have to be a statistics expert, but must know enough to work effectively with the statistician(s) to design the experiments and develop an analysis protocol. The statistics experts have to be masters of their discipline, so that they can help plan the most appropriate designs and analyses. If warranted, they should be able to suggest where the development of new methodologies would fit into the research program. The other team members need to know enough to conform with (and not undermine) the research plan and to support any innovations.<sup>3</sup>

The chapters covering this domain have provided a systematic approach to planning and reporting synthesis of disciplinary and stakeholder knowledge through detailed consideration of a five-question framework. They have also outlined the concepts, methods, case examples and guides that must be collected and developed to make I2S an effective discipline through a Big-Science-like project: the I2S Development Drive.

In the next group of chapters, the framework is applied to the second domain of integrative applied research and I2S—namely understanding and managing diverse unknowns.

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<sup>3</sup> Examples include adhering to the randomisation process in a randomised controlled trial (and not allocating participants according to preference) and collecting data according to the protocols established.

This text is taken from *Disciplining Interdisciplinarity: Integration and Implementation Sciences for Researching Complex Real-World Problems*, by Gabriele Bammer, published 2013 by ANU E Press, The Australian National University, Canberra, Australia.